

CLAIMS

What is claimed is:

1. An integrated and self contained diesel hydraulic thruster system integral with a dynamic positioning control system for dynamic positioning of any waterborne vessel having a hull with at least two sides and a deck connecting the sides, comprising:

5

a. at least two azimuthing thrusters, each removably mounted to the vessel, comprising:

10

i. a skid removably secured to the deck;

ii. an upper thruster housing, removably connected to the skid, containing steering gear with hydraulic slewing drive and electrical steering angle feedback sensors and a multi-port hydraulic swivel assembly;

15 iii. a stem moveably connected with a connector to the skid;

iv. a strut connected to the stem;

v. a hydraulic pod connected to the strut; wherein the pod comprises a housing a hydraulic motor contained within the housing ;

15

vi. a drive shaft connected to the hydraulic motor on one end;

vii. at least one propeller with nozzle connected to the drive shaft; and

viii. a bundle of stem hydraulic hoses connecting on one end to the multi-port hydraulic swivel assembly and on the other end to the hydraulic motor;

20

b. at least two self-contained diesel hydraulic power units removably secured to the deck, one for each thruster, comprising:

i. a housing comprising a diesel engine with a fuel day tank, wherein the diesel engine is connected to a hydraulic pump with a hydraulic reservoir

- and a hydraulic cooler;
- ii. a cooling system for the engine;
 - iii. an exhaust system for the engine;
 - iv. an alternator for the engine;
 - 5 v. an electrical control system for the engine;
 - vi. an electric starter for the engine;
 - vii. a battery for the engine; and
 - viii. a bundle of hydraulic hoses and an electrical control cable, each having a first and second end, wherein each the first ends are secured to the hydraulic power unit and the other ends are secured to the thruster skid;
- 10
- c. at least one dynamic positioning computer connected to each of the self contained diesel hydraulic power units;
 - d. at least one motion reference sensor connected to the dynamic positioning computer to correct reference position signals for motion of the vessel;
 - e. at least one heading sensor; and
 - 15 f. at least one sensor selected from the group consisting of position reference sensors connected to the dynamic positioning computer; environmental sensors connected to the dynamic positioning computer; and combinations thereof.
2. The system of claim 1, wherein one or more hydraulic cylinders at the connector are used to tilt the stem upwards to a stowed position of the thruster, whereby the thruster is completely out of the water.
- 20
3. The system of claim 1, wherein the position reference sensors are selected from the group consisting of global positioning system (GPS) sensors; hydro-acoustic sensors; fan beam

laser sensors; Artimis system signal sensors; vertical taut wire system sensors, horizontal taut wire system sensors; and differential and absolute reference positioning system (DARPS) sensors.

4. The system of claim 1, wherein the environmental sensors are selected from the group consisting of wind sensors, current sensor and combinations thereof.
5. The system of claim 1, wherein the dynamic positioning computer further comprises at least one uninterruptible power source connected to the computer.
6. The system of claim 1, wherein the diesel engine ranges from about 150 horsepower to about 1000 horsepower.
- 10 7. The system of claim 1, wherein the motor is a variable speed hydraulic motor.
8. The system of claim 1, wherein the motor is reversible.
9. The system of claim 1, wherein the connector is a hinge.
10. The system of claim 1, wherein the stem is bolted to the skid.
11. The system of claim 1, wherein the stem further comprises at least one hydraulic cylinder connected to the stem to raise or lower the stem.
- 15 12. The system of claim 1, wherein the thruster is mounted to the deck of the vessel.
13. The system of claim 1, wherein the thruster is mounted to the side of the hull above the water line of the vessel.
14. The system of claim 1, comprising at least two thrusters.
- 20 15. A waterborne vessel comprising at least two thrusters as defined in claim 1.